Hydraulic Fracturing and the Haynesville Shale

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Louisiana Water Quality Technology Conference

Alexandria, Louisiana

About Us

Louisiana Oil and Gas Association

- Trade organization representing independent oil and gas producers
- A primary goal is to educate the public and private sectors of the importance of the oil and gas industry in the state of Louisiana
- Represents over 1000 member companies across the State

About Us

EXCO Resources, Inc.

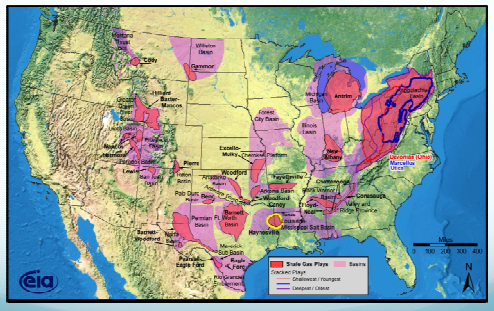
- Second largest producer of natural gas in Louisiana
- $5 Billion market cap, NYSE XCO
- Employs over 900 professionals
- Operates 22 modern top-drive drilling rigs in the Haynesville Shale
- Field offices in Waskom, San Augustine, Texas
  Grand Cane and Vernon, Louisiana
  Pittsburgh, Pennsylvania

General Overview

Hydraulic Fracturing, also known as “Hydrofracking” or “Fracking”

- Well developed and refined engineering technique
- Occurs ***AFTER*** the drilling process and ***AFTER*** a temporary wellhead has been installed
- Involves pumping sand, water & chemicals into the wellbore
- High pressure is used to force mixture into the formation
- Results in tiny fractures in the rock and shale
- Increases the rate and amount of hydrocarbon recovery

Shale Plays is US



Hydraulic Fracturing is applied to the majority of America’s oil and natural gas wells in order to:

- Enhance Performance of the well
  - Minimize Drilling
    - Minimize Environmental Impact
      - Recover previously non-producable resources

Some estimates put the total at 90% of all wells drilled in the US are completed by using hydraulic fracturing

Fracking Issues

Hydraulic Fracturing brings two main issues...

- Sourcing of frac water in areas with scarce supplies
- Fracturing the formation and perceived problems with technique

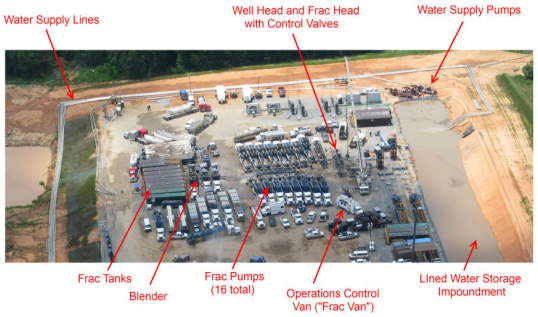
To understand the process better, let's see how it is performed...

Video can be seen at www.HSEC.la

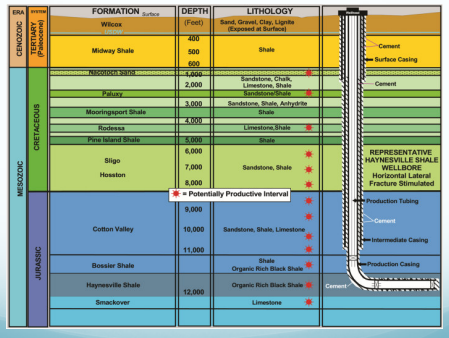
History

- Technique has been in existence for over 60 years
- First commercial "Frac" job was conducted in 1947
- More than 1 million wells had been completed using this method by 1988


Schlumberger
OYCE CRANE



Typical Haynesville Well



Courtesy Office of Conservation

Results

- Aided in the extraction of more that 600 TCF gas
- Aided in the extraction of more than 7 billion bbl oil
- Shale plays have increased the supply of Natural Gas from ±9 years to over 100 years based on current US consumption – made possible by Hydraulic Fracturing

Regulation & Safety

- Currently regulated by individual states
- Current attention is focused on taking away the states right to regulate the activity and putting EPA in charge
- State requires permits that are reviewed to ensure protection of both citizens and the environment
- Main concern is drinking water, and to date, there are no confirmed aquifer or water contamination cases with with over 1 million wells fracked

Existing Federal Rules

- In addition to the state regulations, there are Federal rules with which operators must comply:
  - Occupational Safety and Health Administration (OSHA)
  - Comprehensive Env Response, Compensation, and Liability Act (CERCLA)
  - Toxic Substances Control Act (TSCA)

All of which ensure that the chemicals used in the extraction are properly handled and stored, and that the workers and first responders are made aware of the substances they are handling.

Frac Fluid Composition

- The base fluid is water. Freshwater is of 95% of the base
- Gelling agent, often guar (made from beans)
- Proppant, often sand or manufactured ceramic beads
- Friction reducer (similar to detergent)
- Bacteracide (similar to chlorine in a swimming pool)
- Trace amounts of other chemicals complete the mixture
- While toxic, the amounts in which they used put them well below the level in which they would be harmful to the water table

Disclosure

- EPA and Federal Legislators are moving to require disclosure of the chemicals and their composition – here are some industry responses
  - Most gas producers support disclosure
  - Industry orgs (ANGA, IPAA, AXPC) endorse state-based registry for disclosure of hydraulic fracturing chemicals
  - In September, the GWPC announced that it would create a voluntary, state-based registry that would be accessible to the public online.
  - The registry, being developed by the GWPC and the IOGCC, is expected to launch this month

Safety Studies

- Studies completed by respected authorities have all concluded that hydraulic fracturing is safe
  - The GWPC survey of state energy regulatory agencies found no documented cases of contaminated drinking water linked to hydraulic fracturing
  - 2002 study conducted by the IOGCC confirmed the GWPC's conclusion that there was no evidence of contaminated drinking water due to hydraulic fracturing
  - 2004 The EPA agreed with the GWPC and the IOGCC that hydraulic fracturing is safe. EPA said hydraulic fracturing does not create pathways for fluids to travel between rock formations and underground sources of drinking water
  - 2005 Energy Policy Act exempted Fracking from UIC regs, placing it under SDWA.

FRAC ACT

S.1215 & H.R. 2766

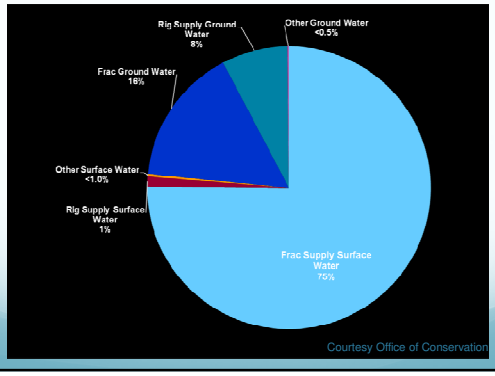
Would repeal the exemption for hydraulic fracturing in the Safe Drinking Water Act

Would add federal regulation to the act of fracking a well. Gas industry opposed because of no benefit to the regulation

Water Sourcing

- Fracturing uses large volumes of water
- Fresh water is required
- Industry is concerned about aquifer depletion
- DNR/Office of Conservation required reporting of frac water sources and volumes

E&P Water Sources in LA

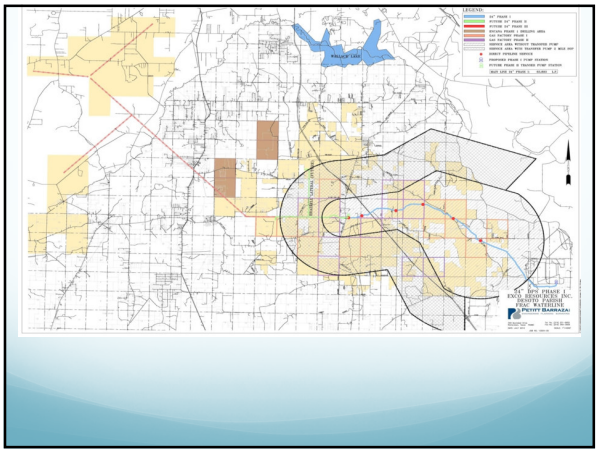


EXCO's Actions

- Eliminate USDW sources completely from frac sourcing
- Use surface water in all cases
- Industry-leading innovative use of industrial waste water

IP Water Source

- EXCO has invested nearly $20 million in frac water system
- System in use now
- Have provided water to other operators
- Allows EXCO to completely avoid underground water sources for frac supply, conserving groundwater




IMPACT

Economic Benefits

Focus on the Haynesville Shale

2009 Study by LSU Economist Loren Scott

- Over $10.6 Billion in new business sales in Louisiana
- Over $5.7 Billion in additional household earnings
- Represents 3.6% of the personal income in LA.
- In the 2010 follow-up study it was estimated that the Haynesville Shale discovery had a $17 Billion impact on the state and local economies

Conclusion

- Hydraulic Fracturing is well-regulated, safe and has a proven track record
- Water sourcing can be done in a manner protective of USDW
- It is vital to our nation's energy security for us to continue to produce American oil and natural gas
- We cannot economically and effectively produce oil and gas without hydraulic fracturing

EXCO is committed to being a leading producer of natural gas in Louisiana, and is leading in finding innovative water sourcing solutions for the industry.

Natural Gas is an American fuel, produced by Americans, employing Americans, and paying taxes to local and state governments.